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Problem 1

1. Suppose that 65% of all college women have been on a diet within the last 6 months. A survey is planned to interview a simple random sample of 100 college women if they were on a diet within the last 6 months. What is the probability that 70% or more of the women in the sample have been on a diet in the last 6 months? [4]

Problem 2

2. The following graph shows two sampling distributions of two sample proportions (Distribution I is taller.) The population from which we sample is the same in both cases. What can we conclude? Hint: Think in terms of the spread.
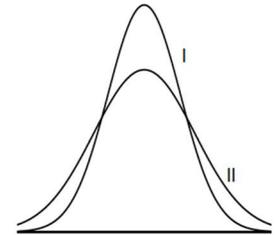
   a) The sample proportion in I comes from a larger sample from that of II.
   b) The sample proportion in II comes from a larger sample from that of I.
   c) The sample sizes for both sample proportions are equal to each other.
   d) The sample sizes are different, but it cannot be determined which is larger.
   e) Something is wrong. If the population is the same in both cases, the sampling distributions should look the same.

Problem 3

3. Historically, 51% voters in a certain state voted for a Republican candidate as state governor. A new governor election is coming up and a survey of randomly selected 100 voters from this state will be conducted, what is the probability that more than 55% will vote for the Republican candidate? Find the closest answer.
   a) 0.83   b) 0.04   c) 0.79   d) 0.96   e) 0.21

Problem 4

A hospital administrator hoping to improve wait times decides to estimate the average emergency room waiting time at her hospital. She collects a simple random sample of 64 patients and determines the time (in minutes) between when they checked in to the ER until they were first seen by a doctor. A 95% confidence interval based on this sample is (128 minutes, 147 minutes), which is based on the normal model for the mean.

Determine whether the following statements are true or false, and explain your reasoning. [4]

1. This confidence interval is not valid since we do not know if the population distribution of the ER wait times is nearly Normal.
2. We are 95% confident that the average waiting time of these 64 emergency room patients is between 128 and 147 minutes.
3. We are 95% confident that the average waiting time of all patients at this hospital's emergency room is between 128 and 147 minutes.
4. 95% of random samples have a sample mean between 128 and 147 minutes.
5. A 99% confidence interval would be narrower than the 95% confidence interval since we need to be surer of our estimate.
6. The margin of error is 9.5 and the sample mean is 137.5.

[1] Math-UOttawa 2. UVermont 3 Utts [4] OpenIntro

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7. In order to decrease the margin of error of a 95% confidence interval to half of what it is now, we would need to double the sample size.

Problem 5[4]

The 2010 General Social Survey asked the question: "After an average work day, about how many hours do you have to relax or pursue activities that you enjoy?" to a random sample of 1,155 Americans.[41] A 95% confidence interval for the mean number of hours spent relaxing or pursuing activities they enjoy was (1.38, 1.92).

8. Interpret this interval in context of the data.
9. Suppose another set of researchers reported a confidence interval with a larger margin of error based on the same sample of 1,155 Americans. How does their confidence level compare to the confidence level of the interval stated above?
10. Suppose next year a new survey asking the same question is conducted, and this time the sample size is 2,500. Assuming that the population characteristics, with respect to how much time people spend relaxing after work, have not changed much within a year. How will the margin of error of the 95% confidence interval constructed based on data from the new survey compare to the margin of error of the interval stated above?